Kodak Retinette 1B, Type 045.
Prontor 500LK Shutter (1963).

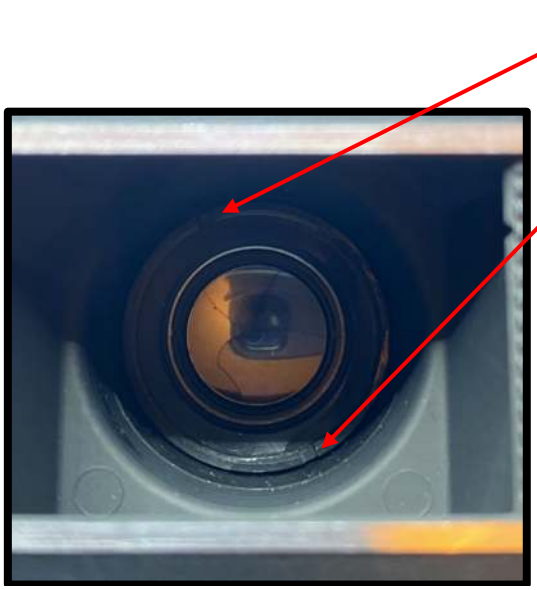
CLA of Shutter
Tim Langsford, September 2020.

Preliminary Examination:

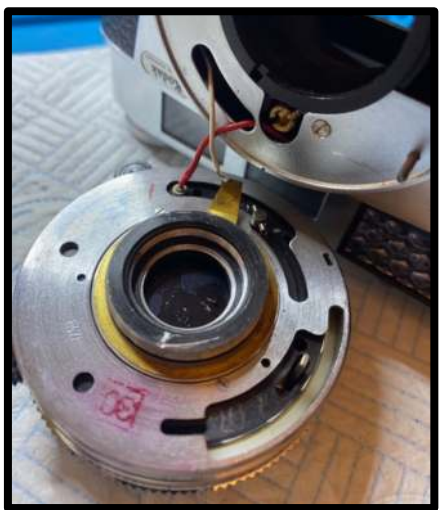
Camera very clean. Aperture smooth. Speed cam a little too tight. Speeds seem ok, no visible oil on shutter blades. Optics are clean. Basically, seems a shame to disassemble this camera but, in the name of learning, I will do so!

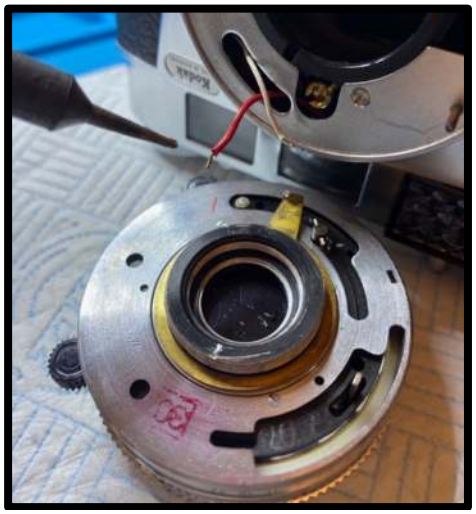
A. Dismantling Camera to Free the Shutter Mechanism:

1. Free the shutter by unscrewing the outer retaining ring, via the 2 notches. I initially really struggled with this step as none of my spanner wrenches would fit (leading to scratches on the ring). Luckily, a pair of large circlip pliers from my toolbox worked perfectly.

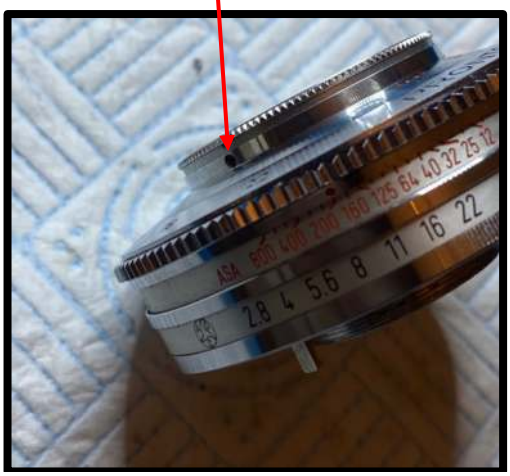


2. De-solder the flash contact wires, noting the colours.



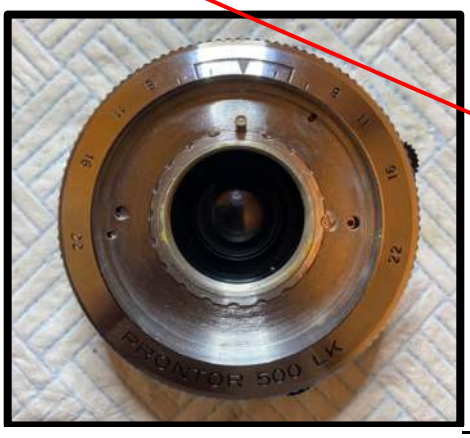


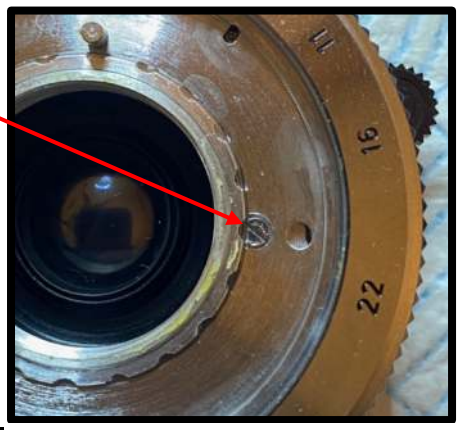
3. Set focus to infinity. Remove focus ring by loosening (but not removing all the way), the 3 grub screws set into the ring. In order to get focus accurately reset when reassembling, note where the front lens group writing sits (on this camera, the ‘o’ in ‘Reomar’ sat pretty much at infinity), then tighten the group clockwise to see how much further it moves (I made a video of this action to be sure). Then, remove this lens group by unscrewing anti-clockwise.

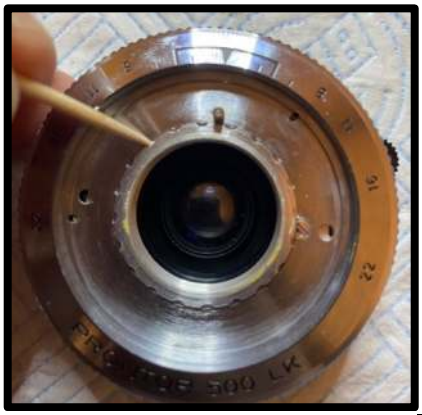


B. Prontor 500 LK Shutter Mechanism Disassembly:

1. Turn lock-nut 180˚ and unscrew the scalloped retaining ring.



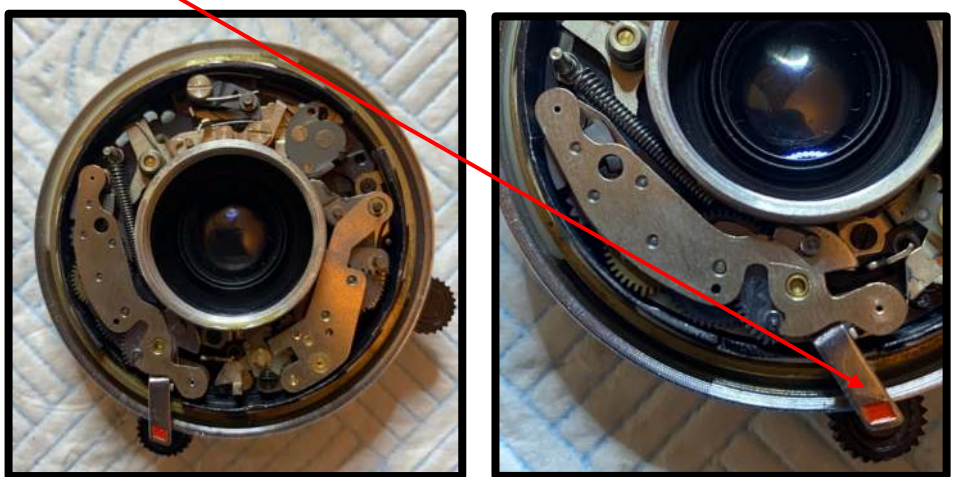




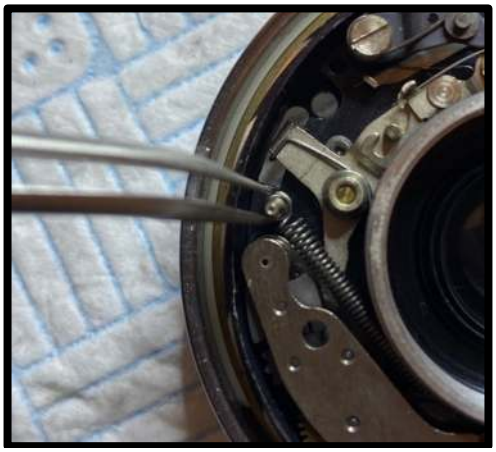
2. Lift off the ASA setting ring and the cover plate together.

3. Disconnect the detent lever from its speed cam slots by inserting a pointed tool in the hole of the detent lever and moving the lever toward the outside of the housing while lifting the speed cam slightly. Once the speed cam is mostly free, slide it over the delayed action setting lever to remove.

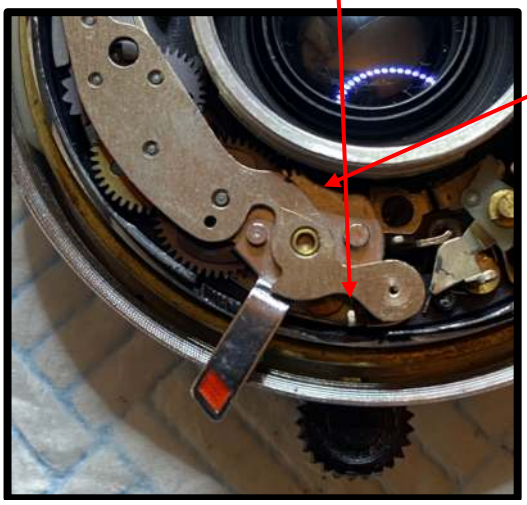
4. To remove the delayed action return spring, first set the lever to the fully released position.



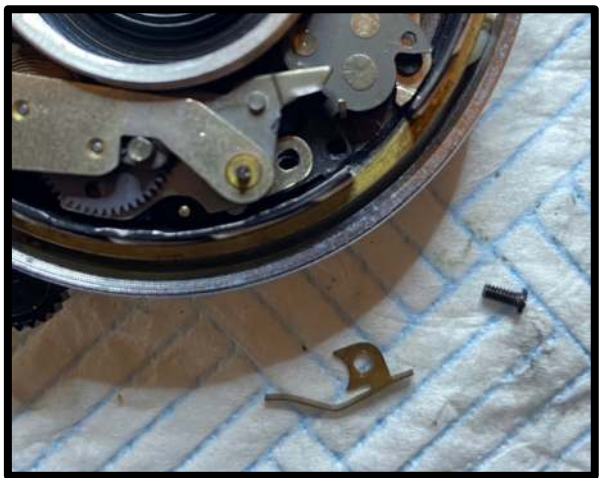
5. Use tweezers to lift the spring coil off its post and slide the spring out.



6. Depress the locking lever and turn the delayed action lever until the flat side of the first gear sits against the lens barrel. Lift the whole escapement out.



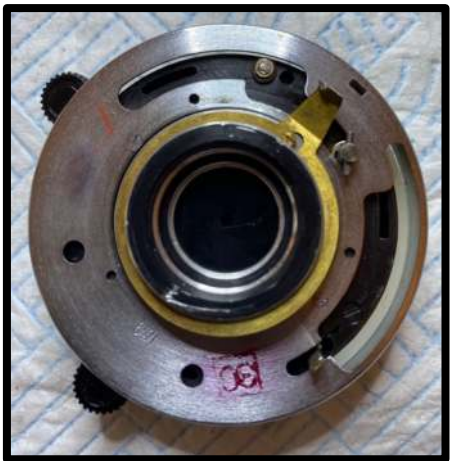
7. Cock the shutter. Remove the 2 screws holding the speeds escapement. Lift out the top contact plate, then the escapement.



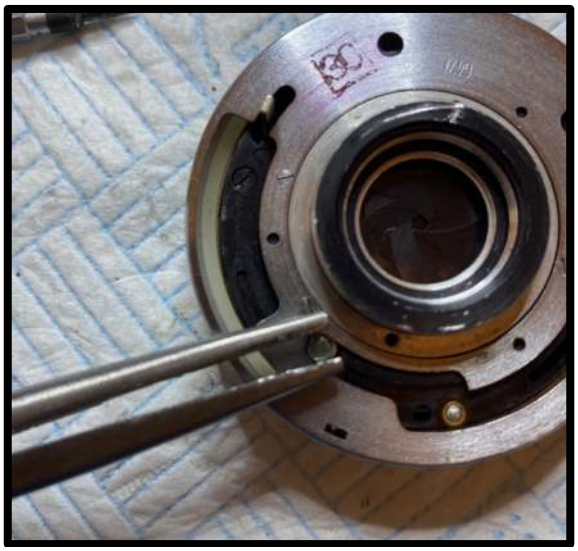
8. To remove the blade operating ring spring, detach the long end then lift the spring from its stud.

9. To remove the detent lever, disengage its spring first.

10. Remove the lower contact plate.

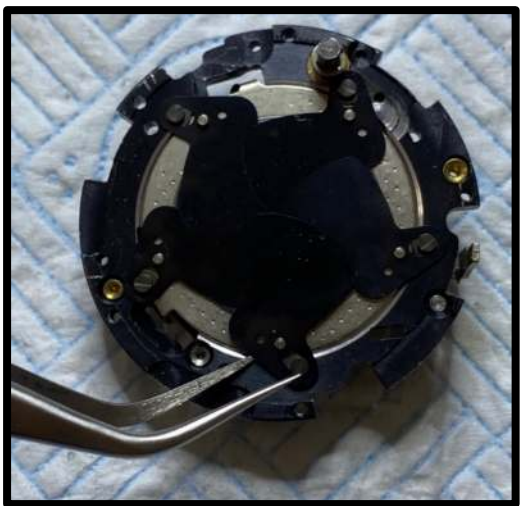
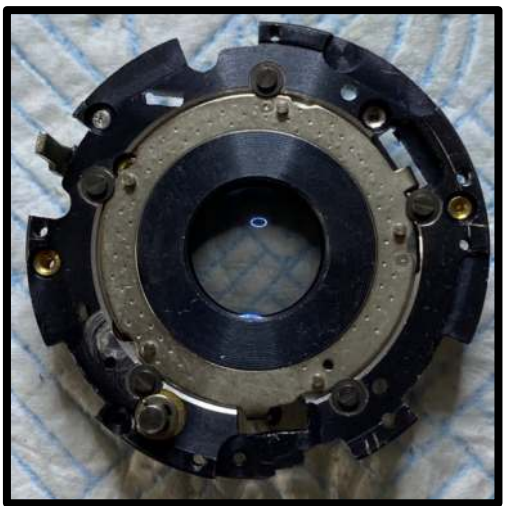


11. Use needle-nose pliers to push the taper pin out from its housing.

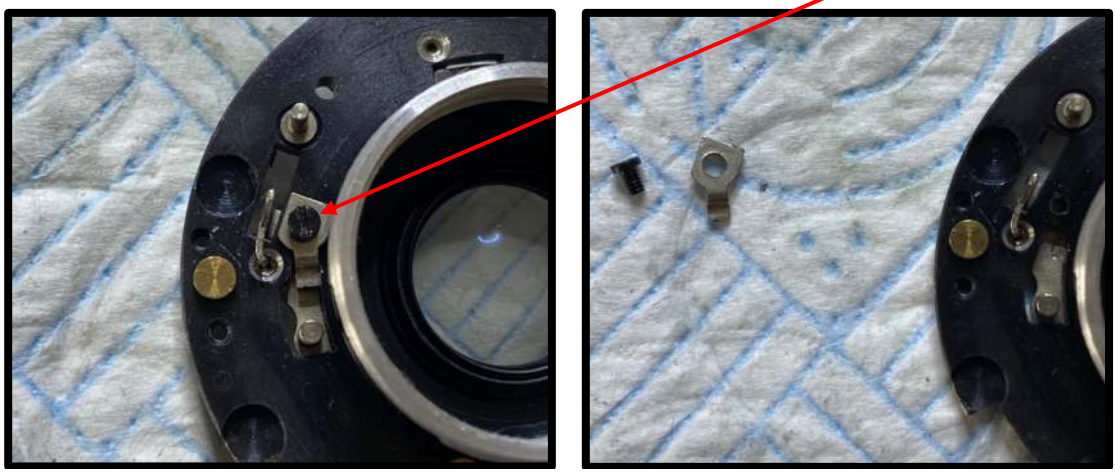


12. Turn the diaphragm control plate until all 4 screws can be seen and removed. Note the position of the long screw. Gently lift the mechanism plate from the shutter housing.

13. Gently lift off each of the 5 shutter blades. Don't touch them with your fingers.

14. Check that the main lever is still in the cocked position. Remove the ring stop. Remove the blade operating ring.



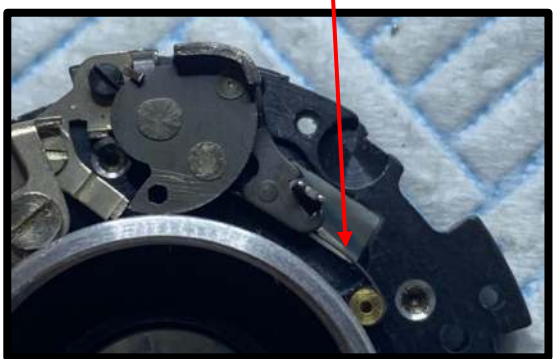
This is as far as I deemed necessary to disassemble this particular camera as the aperture blades seem perfectly clean and the main lever functions well.

C. Cleaning, Lubrication and Reassembly of Shutter:

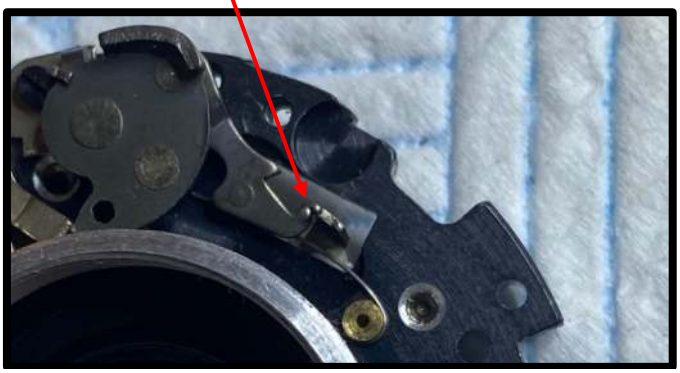
** Note: All parts were cleaned with 99.9% isopropyl alcohol prior to reinstallation.*

1. On my example, the central lens element seemed quite firmly fixed in place so I cleaned it with ROR before proceeding with reassembly.

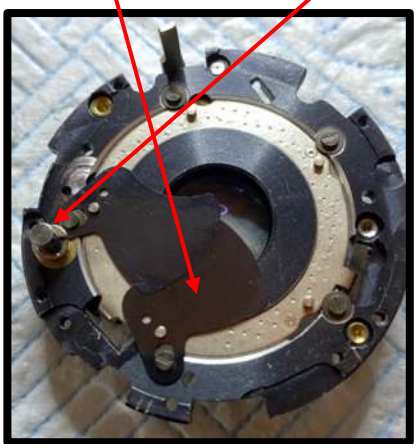
2. After cleaning the ring itself and the track it sits in, reinstall the blade operating ring. Ensure the notched stud is on the outside of the leaf lever spring and that the leaf lever is connected properly. Then reinstall the ring stop.



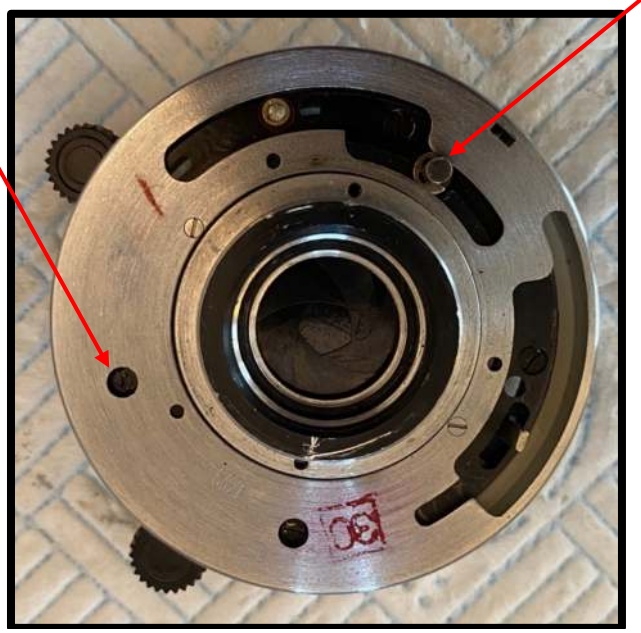
3. At this stage, the NatCam repair course advises cocking and releasing the shutter ‘several times’ to check function. However, doing so will cause the leaf lever to disengage from the notched stud and become stuck. This then necessitates removal of ring stop and blade operating ring and reinstallation (which I found frustrating due to the ring stop screw being very hard to get started). In order to avoid this issue, reinstall the blade operating ring spring before cocking and releasing.



4. Carefully clean the shutter blades and then reinstall in a clockwise sequence, starting with the blade nearest the leaf lever. The second blade will need slight tilting to seat due to being next to the main lever.



5. Carefully seat the mechanism plate, using the cut-out where the main lever passes through as a guide. Reinstall the 4 screws, ensuring the long screw is in the correct position.

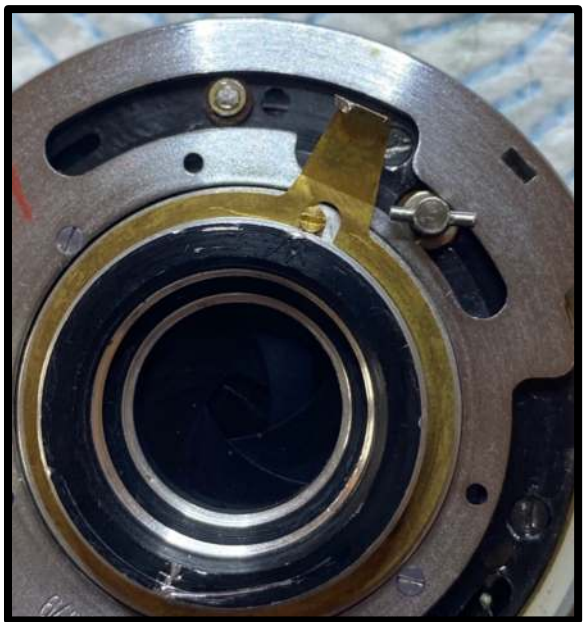


6. Reinstall the taper pin.

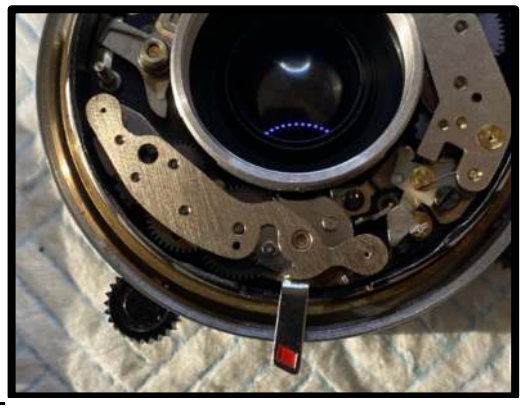
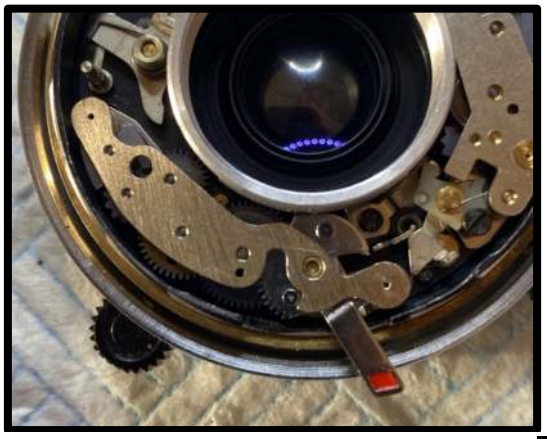
7. Reinstall the detent lever then reposition its spring.

8. I chose to use an ultrasonic cleaner for the escapements. The liquid was just water with a little dishwash soap. I set the cleaner for about 5 minutes, then flushed with fresh water and finally isopropyl before using a hand blower.

9. The speeds escapement was lubricated at the pivot points using Nyoil. The shutter needs to be cocked before reinstalling this escapement. It is important to ensure the extension of the contact closing lever (the little tail) fits into the notch on the blade operating ring stud, also that the pallet control lever is seated between the shutter housing and its own operating ring stud. Use curved tweezers to point the aforementioned tail towards the lens barrel then lower the escapement into place (you may need to turn the retard lever slightly and move the pallet lever to get things in place). Lightly secure the pallet end and use tweezers to get the contact closing lever tail sitting within the notch. You will know when it's in place as it won't move in either direction. Work the retard lever to ensure it moves freely, then tighten the screw at the pallet lever end. Reinstall the top contact plate. Reinstall the second (retard end) screw. Reinstall the lower contact plate.

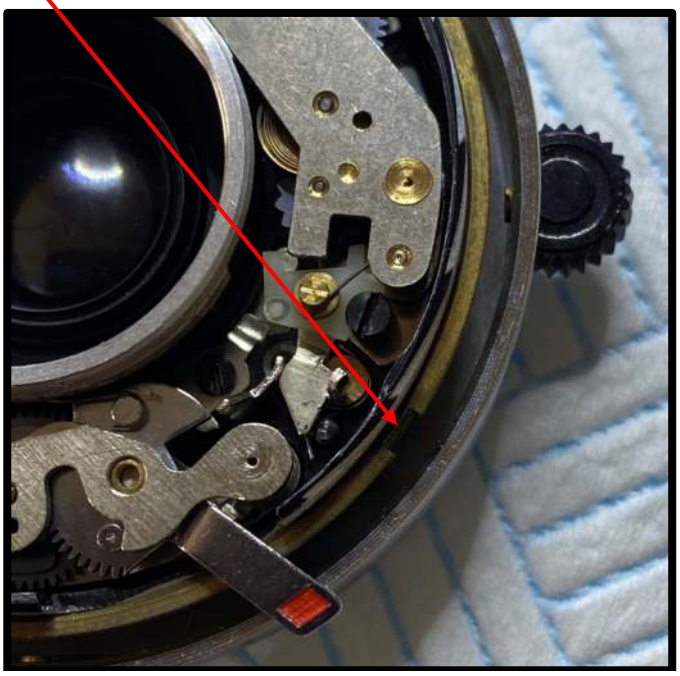


10. The delayed action escapement was oiled in the same way. Turn the lever so that the first gear is in position and the escapement can be lowered into place. Then move the lever back to the fully released position. The NatCam instructions say that the return spring should have coils facing down, however, on my camera, they were facing up when I opened the shutter so I reinstalled them in the same orientation. Seat the coiled end onto its post first, then pull the hooked end into place.

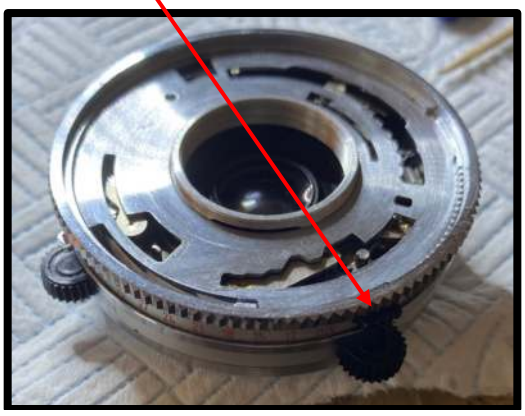
11. I used moly grease to very lightly lubricate the contact points of moving parts, particularly the main lever, retard lever, pallet lever and bulb lever. After cleaning, I also lubricated the points on the speed cam which come into contact with the levers.

12. Move the notch in the brass speed ring until it is adjacent to the pallet lever.



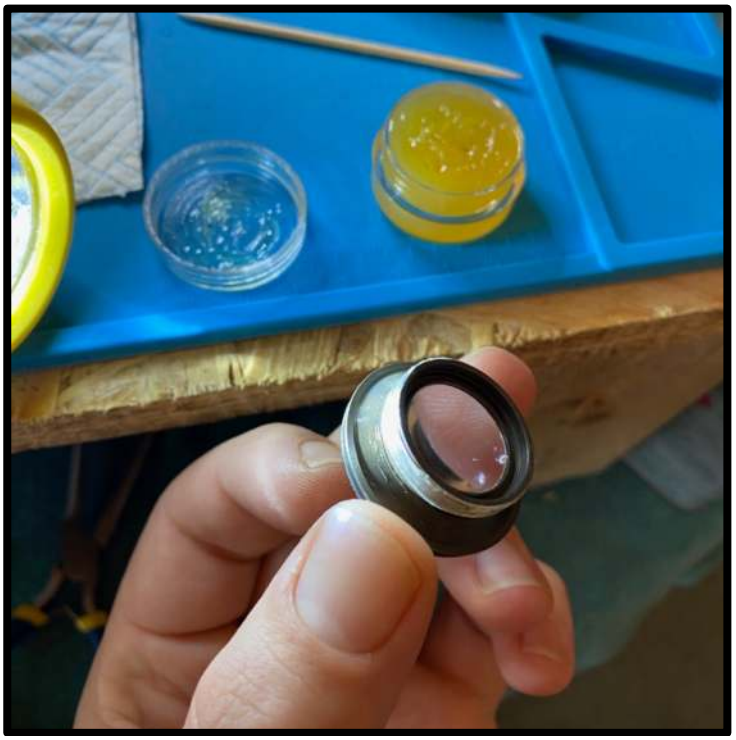
13. Reinstall the speed cam, and reseat the detent lever.

14. Reinstall the ASA setting ring, ensuring its stud passes into the notch on the speed ring. Press the little black button to seat this ring fully.

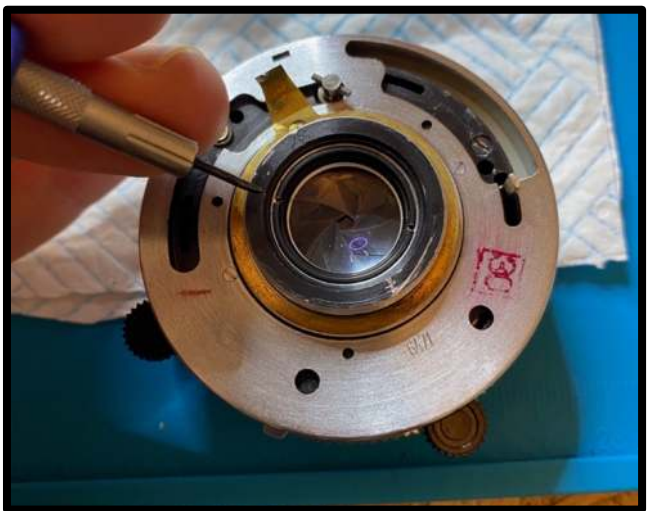


15. Align the cover plate so that it fits with the 2 locating studs, then reinstall the scalloped retaining ring (tighten until the speed cam has the desired tension) and finally turn the lock nut.

16. After cleaning off all the old grease, and cleaning both sides of the front lens element, I reapplied some new helicoid grease to the threads.

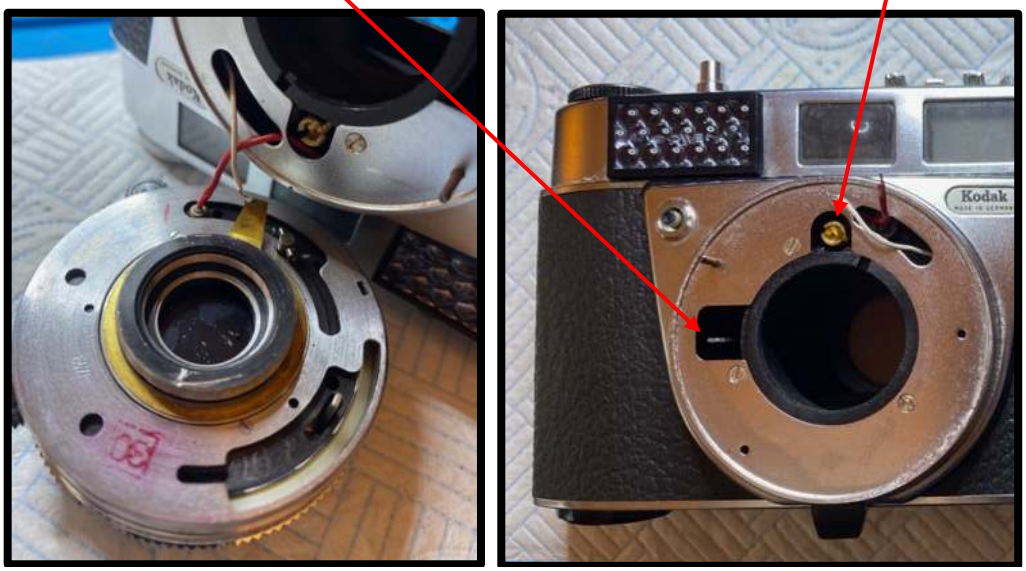


17. The first time I reinstalled the rear lens element and its retaining ring I made the mistake of getting it the wrong way around. Sadly, I didn't discover this until I'd finished reassembly and taken some test shots. Then developed. Then scanned. It led to some crazy effects though, as seen below. To be clear, the convex surface should face outwards, towards the film.



18. Once the rear element is the right way around, the front lens element and focus ring are reinstalled. There was a little bit of trial and error to get the infinity position exactly as it had been, but the video and reference photos I'd taken really helped.

19. The flash-sync wires are then resoldered before the shutter mechanism is re-seated. This can be a bit tricky; it was necessary to rotate the brass camera wind lever so that it connected with the shutter main lever and taper pin. I also found the camera's release lever had a habit of dropping down below the shutter's outer release lever so it wouldn't fire. This was resolved by turning everything upside down so that gravity could help.



20. Once everything is in position, reattach the internal retaining ring – look at the bloody mess I made of this one when disassembling before I realised that circlip pliers are the perfect tool.

D. Testing

1. I used a Phochron XA shutter speed tester to check all shutter speeds. I'm not sure what the factory tolerances were for this camera but I felt these were close enough for my purposes.

2. I loaded the camera with Kentmere 100 (my preferred test film as it's the cheapest) and shot a test roll. These were home developed in ID-11 (1+1) at 20˚ for 11.5 minutes, then scanned with a Plustek 8100.